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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/670,436 | 09/25/2003 | Bernd Hofflinger | 03481-P0007A | 5537 |

24126 7590 01/04/2007
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| EXAMINER |
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NEGRON, WANDA M

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| ART UNIT | PAPER NUMBER |
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2622

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 01/04/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/670,436

Applicant(s)

HOFFLINGER ET AL.

Examiner

Wanda M. Negrón

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-12 and 15-19 is/are rejected.
- 7) ☐ Claim(s) 6, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-5, 7-12, and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over He et al. (US 6,355,965 B1) in view of Melman (US 5,124,547).**

5. Regarding **claim 1 and 15**, He et al. teach a camera module for electronically recording images, i.e. an image device using solid-state MOS integrated circuits (see col. 1, lines 17-23), the module comprising an image sensor (see figure 1) having a plurality of image cells (see col. 1, lines 29-35), wherein each image cell is adapted to provide an electric image signal as a function of incident light, i.e. converting the current produced by incident light to a voltage (see col. 1, lines 39-40), and each image cell having a light-sensitive element, e.g. a photodiode (D_A), for generating a light-

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dependent current (see col. 1, lines 50-53), and at least one MOS transistor ($M1_A$) having a gate terminal and a source-drain path, said MOS transistor being arranged in series with the light-sensitive element (see figure 1, elements D_A and $M1_A$), the gate of the transistor being at a fixed potential, e.g. V_{DD} , and the source-drain path being flowed through by the light-dependent current (see col. 1, lines 50-51). However, He et al. do not disclose that said module also comprises at least one light source arranged in a vicinity of the image sensor, said light source being adapted to illuminate the image cells.

Melman, on the other hand, discloses the use of a light source, i.e. a LED (30), arranged in the vicinity of the image sensor (see figure 1), said light source being adapted to illuminate the image cells (see figure 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the light source disclosed by Melman in the camera module taught by He et al. in order to obtain a light source arranged in the vicinity of the image sensor because doing this would produce a known reference level for reducing the FPN (see He et al., col. 2, lines 58-66).

6. Regarding **claims 2 - 4 and 16**, Official Notice is taken that the use of camera modules in an invisible spectral region, an infrared spectral region, or in a region of about 880 nm is well known in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a light source that illuminates within any of said spectral regions because it would increase the spectral operating range of the camera module.

7. Regarding **claims 5 and 17**, it is inherent that, in order to keep the light source from inaccurately illuminating the intended sensor, said source would need to be integrated into the camera module in a stationary fashion.

8. Regarding **claim 7**, Official Notice is taken that it is well known in the art to have a solid-state MOS sensor circuit in the same printed circuit board as other camera elements in order to reduce the size of the imaging device. Therefore, it would have been obvious to one having ordinary skill in the art to arrange the light source in the same circuit board as the image sensor because this reduces the size of the camera module making it more compact.

9. Regarding **claims 8 and 18**, Official Notice is taken that a timing element is conventionally used to accurately perform the integration and read-out processes in an imaging device. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a timing element to activate the light source for a predefined period of time as a function of the image signals because doing so would decrease the power required to operate the camera since the light source would only be used when necessary.

10. Regarding **claims 9, 10 and 19**, Official Notice is taken that a control element such as a CPU is conventionally used to control the operation of the elements in a camera. In addition, it would be inherent to obtain an image signal representing a mean light intensity that is higher when using a light source than an image signal representing a mean light intensity without the light source because, when the light source is turned on, more photons impinge on the sensor than without it. The factor by which the mean light intensity would be higher depends on the output of the light source and the period

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of time it is turned on for illumination of the pixels by a controlling element. A factor range of 5-200 or 10-100 is obtained by controlling the light source to turn on for the required amount of time.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a CPU to control the operation of the light source such that the image signals representing a mean light intensity using a light source is higher than compared without the light source by a factor of approximately 5-200, and 10-100 because this would increase the dynamic range of the camera module.

11. Regarding method **claim 11**, it is drawn to the method of using the corresponding apparatus claimed in claim 1. Therefore method claim 11 corresponds to apparatus claim 1, and is rejected for the same reasons of obviousness as used above.

12. Regarding **claim 12**, Official Notice is taken that, conventionally, in an image sensor the electric image signals are read out during first time intervals which are separated from one another, and wherein the light-sensitive elements are illuminated during second time intervals separated from one another, the first and second time intervals being different from one another. In other words, conventionally, the sensing cells are not illuminated during the read-out process. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to read out the electric image signals during first time intervals which are separated from one another, and wherein the light-sensitive elements are illuminated during second time intervals separated from one another, the first and second time intervals being different from one another because this would prevent unintended image signals to be added to the image signals being read out.

Allowable Subject Matter

13. **Claims 6, 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

14. The following is a statement of reasons for the indication of allowable subject matter:

Regarding **claim 6**, the relevant prior art does not anticipate or render obvious that the light source is **designed in the shape of a ring surrounding the image sensor**.

Regarding **claim 13**, the relevant prior art does not anticipate or render obvious that the light-sensitive elements are illuminated whenever **a predefined basic brightness exceeds a first threshold value**.

Regarding **claim 14**, the relevant prior art does not anticipate or render obvious that the light-sensitive elements are illuminated **only when image signals read-out during consecutive third time intervals differ by more than a second threshold value**.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Loose et al. ("A Self-Calibrating Single-Chip CMOS Camera with Logarithmic Response", IEEE Journal of Solid-State Circuits, vol. 36, no. 4, April 2001, pp.

586-587) disclose that, in order to calibrate a logarithmic pixel sensor, it is necessary to either set the light intensity for all pixels to a known level to obtain a known photocurrent or to stimulate the sensor circuit by a reference current.

- Marshall and Collins ("*A High Dynamic Range Front End for Automatic Image Processing Applications*", SPIE vol. 3410, May 1998, pp. 176-184) disclose a method for automatic calibration of MOS logarithmic pixels using the response of each pixel to a uniformly illuminated scene.
- Fremont (US 4,755,875) discloses a telecine apparatus that uses an electro-optical image transducer, which is illuminated with a bias light at predetermined periods of time.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wanda M. Negrón whose telephone number is (571) 270-1129. The examiner can normally be reached on Mon-Fri 6:30 am - 4:00 pm alternate Fri off.

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or (571) 272-1000.

Wanda M. Negrón
December 26, 2006


TUAN HO
PRIMARY EXAMINER